

UNITED STATES DISTRICT COURT  
DISTRICT OF MASSACHUSETTS

C.A. No. 04-12135-NG

ROBERT WADE,  
Petitioner

v.

BERNARD F. BRADY, Acting Superintendent, and  
THOMAS F. REILLY, Attorney General,  
Respondents

**AFFIDAVIT OF DR. ALBERT B. HARPER**

I, Dr. Albert B. Harper, do hereby declare and verify  
as follows:

1. I am the Director of the Henry C. Lee Institute  
of Forensic Science at the University of New  
Haven. My duties include training law enforcement  
officers and attorneys in the application of  
Forensic Science to legal issues, including  
matters involving crime scene investigation, crime  
scene reconstruction, bloodstain pattern analysis,  
forensic use of DNA and homicide investigation.
2. My duties as Director of the Henry C. Lee  
Institute of Forensic Science at the University of  
New Haven also include providing Forensic Science  
expertise in the above mentioned areas of Forensic

Science for law enforcement agencies and attorneys. Said Forensic Science consultation has been provided to both prosecutors and defense attorneys in numerous states, including Massachusetts. I have been qualified to testify as an expert in forensic science in Maine, Connecticut, New York, Florida, and Pennsylvania.

3. I am also a licensed attorney in the State of Connecticut and practice criminal defense law.
4. At the request of Attorney Janet H. Pumphrey, I have reviewed a laboratory report on case C93-1187 Lakeville dated March 10, 1997, a criminalistics report on case C93-1187 Lakeville dated June 27, 1997 from the Massachusetts State Police Crime Laboratory and signed by one Debbie McKillop-Shields, and a trial transcript of the testimony of Debbie McKillop-Shields designated pages 4- 174 to 4- 188.
5. Based on my review on the above materials, it is apparent that there is biological evidence of the presence of more than two persons on the orange pants worn by the victim.
6. Trial testimony of Debbie McKillop-Shields concurred in this finding, but did not elucidate the fact that the identity of the source of the

second individual was not pursued by the State Police Crime Laboratory.

7. The serological methods used in the analysis of the biological materials found in the crotch of the orange pants worn by the victim inherently lack the discrimination power to identify the source of the biological materials to a single individual person.
8. At the time of the analysis, PCR based DNA techniques existed that would have offered substantial certainty as to the identity of the source of the biological materials found in the crotch of the orange pants worn by the victim.
9. Though available and in routine use in criminal prosecutions at the time of trial, neither the State nor the defendant conducted said PCR based DNA tests.
10. The serological testing that was performed was either an antigen specific reaction or an electrophoresis based test that was of limited discriminatory power that required large amounts of relatively recent biological material. The serology results reported on March 10, 1997 indicated that the Defendant is blood group of H/O

12. I hereby certify that the facts set forth above are true and correct to the best of my personal knowledge and belief.

A handwritten signature in black ink, appearing to read 'A. B. Harper', is written over a horizontal line.

Dr. Albert B. Harper  
Executive Director  
Henry C. Lee Institute of Forensic Science



WILLIAM F. WELD  
GOVERNOR

KATHLEEN M. O'TOOLE  
SECRETARY

COLONEL REED V. HILLMAN  
SUPERINTENDENT

# The Commonwealth of Massachusetts Department of State Police

Crime Laboratory  
59 Horse Pond Road  
Sudbury, Massachusetts 01776  
Telephone (508) 358-3110  
Fax (508) 358-3111  
June 27, 1997

## CRIMINALISTICS REPORT

LAB. NO.: C93-1187 Lakeville (CPAC)

INCIDENT NO.: 93-113-0900-0236

Examination of Materials in Connection with a  
Fatal Beating/Reported Sexual Assault in Lakeville  
on October 24, 1993.

Victim: Johanna Francescon  
Suspects: Robert Wade

On October 25, 1993, Sergeant Thomas Bavin of the Lakeville Police Department delivered the following items to the laboratory in connection with the above subject:

OUT { - Hospital Specimen Kit - Francescon #  
- Yellow Sheet and T-shirt - Wade (living quarters)  
- Blue Pants and Brown Belt - Wade

On November 18, 1993, Trooper Frank Hommel of Plymouth CPAC delivered the following item to the laboratory in connection with the above subject:

Blue Tablecloth - Wade (living quarters - outside)

On November 23, Trooper Leonard Coppenrath of Plymouth CPAC delivered the following items to the laboratory in connection with the above subject:

Comforter - Wade (living quarters)  
White Bra - Francescon  
Orange Pants - Francescon (from hospital)  
Orange Stripped Shirt - Francescon (from hospital)  
T-shirt - Francescon (from hospital)  
Grey Sweater - Francescon (from hospital)

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On November 24, 1993, the Massachusetts State Police Crime Laboratory received a request for technical assistance in connection with a Fatal Beating/Reported Sexual Assault investigation in Lakeville, MA. I, Debbie McKillop Shields, responded to 26 Howland Road, Lakeville, MA, where I met with the following State Police personnel:

Trooper Patricia Beehan	Fingerprint and Photography Section
Sgt. Robert Kelliher	Plymouth CPAC
Trooper Leonard Coppenrath	Plymouth CPAC
Trooper Frank Hommel	Plymouth CPAC
Sgt. Thomas Bavin	Lakeville Police Department

An examination was conducted of a building identified to me as the workers living quarters. A mattress, bedding, clothing items and numerous debris were noted within the building. Chemical screening tests for the presence of blood were conducted on items examined within this building. Chemical screening tests for the presence of blood were negative on clothing, bedding, a napkin and the mattress (red-brown stain on side). Two additional red-brown stains were noted on the up-side of the mattress. Chemical screening tests for the presence of blood were positive on both red-brown stains noted. Each red-brown stain was removed from the mattress along with a control cutting and transported to the laboratory for further examination and analysis.

On November 26, 1993, Trooper Leonard Coppenrath of Plymouth CPAC delivered the following items to the laboratory in connection with the above subject:

Pubic Hair Combing	- Wade
Pubic Hair Sample	- Wade
Head Hair Combing	- Wade
Head Hair Sample	- Wade
Known Blood Sample	- Wade
Known Saliva Sample	- Wade

*Via  
COURT ORDER*

On May 6, 1995, Sergeant Paula Loud of Plymouth CPAC received the following items from Chemist III, Edward Geraghty:

Hospital Specimens Kit, Yellow Sheet, T-shirt, Blue Pants, Brown Belt,  
Blue Table Cloth,  
Comforter, White Bra, Orange Pants, Orange Striped Shirt, T-shirt, Grey Sweater,  
Pubic Hair Combing, Pubic Hair Sample, Head Hair Combing, Head Hair Sample.



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On June 7, 1995, Sergeant Paula Loud of Plymouth CPAC delivered the following items to the laboratory in connection with the above subject:

Hospital Specimens Kit, Yellow Sheet, T-shirt, Blue Pants, Brown Belt,  
Blue Table Cloth,  
Comforter, White Bra, Orange Pants, Orange Striped Shirt, T-shirt, Grey Sweater,  
Pubic Hair Combing, Pubic Hair Sample, Head Hair Combing, Head Hair Sample.

### EXAMINATIONS

#### Item 1. Hospital Specimens Kit

Item 1a. Hospital Report Forms: This item was reviewed and copied prior to laboratory examination.

Item 1b. Vaginal Smear Slide (1): Microscopic examination revealed the presence of sperm cells.

Item 1c. Vaginal Swabs (3): This item was retained for further testing.

Item 1d. Oral Secretions: This item was retained for further testing.

Item 1e. Fingernail Scrapings: No debris were noted.

#### Clothing Items from Victim (Francescon)

Item 2. Orange Pants: This item consists of a pair of heavily soiled/dirt stained orange pants. Visible red-brown stains were present on the legs. Testing for the presence of human blood was positive on this garment. Testing for the presence of seminal fluid residue and sperm cells was positive of the crotch panel area of this garment. Trace materials recovered from this garment include dirt, vegetative matter and hairs.

Hsp

Item 3. Bra: This item consists of a soiled white bra which appears torn up the back panel. Additional tears were present in both the right and left bra cups. Visible red-brown stains were present on the side panels and clasp area. Testing for the presence of human blood was positive on this garment. Several hairs were recovered from this garment.

Given  
to Police

Item 4. Orange Striped Shirt: Visible blackish residues were present on this garment. Chemical screening tests for the presence of blood were positive on the heaviest soiled area present on the right rear. Visible red-brown stains were also present on the left sleeve, back and rear neck area. Testing for the presence of human blood was positive on this garment. Several hairs were also recovered from this garment.

Hsp

Serology  
Rpt

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Item 5. T-shirt: Visible red-brown stains were present on the front and back (interior and exterior) of this garment. The heaviest concentration was present on the bottom edge and mid-area. Testing for the presence of human blood was positive on this garment. The bottom edge of this garment appears torn.

Item 6. Grey Sweater: This item consists of a heavily soiled/dirty grey sweater. Visible blackish residues were present on this garment. Chemical screening tests for the presence of blood were positive on the interior side of the heaviest soiled area present on the right rear. Visible red-brown stains were also present on the interior portions of this garment. Testing for the presence of human blood was positive on this item. Several hairs were also recovered from this garment.

Item 7. Known Blood Sample - Johanna Francescon: This item has been processed by the Serology section of the laboratory.

Items from Suspect (Wade) and Living Quarters

Item 8. Blue Pants and Brown Belt: Visible red-brown stains were present on the exterior front fly area and upper left leg of this garment. Testing for the presence of human blood was positive on this item. Several hairs were also recovered from this garment.

Item 9. Yellow Sheet: Numerous red-brown stains were present on this item. Testing for the presence of human blood was positive. Several hairs were recovered from this item. A T-shirt (Item 10) was recovered from this item during the examination.

Item 10. T-shirt: This item consists of a heavily soiled T-shirt. Blackish residues and abrasions were present on the back portion of this garment. The left shoulder strap was torn. Visible red-brown stains were present on the left shoulder strap, interior side and chest. Testing for the presence of human blood was positive on this garment. Testing for the presence of seminal fluid residue and sperm cells was positive on whitish stains present on the lower area of this garment. Trace materials recovered from this garment included hairs and vegetative matter.

Item 11. Blue Tablecloth (living quarters - outside): This item consists of a soiled/stained tablecloth. Visible red-brown stains were present on this item. Testing for the presence of human blood was positive.

Item 12. Comforter: This item consists of a heavily soiled floral comforter. Visible red-brown stains were present on this item. Testing for the presence of human blood was positive. Several hairs were recovered from this item.

Item 13. Pubic Hair Combing - Robert Wade: Numerous hairs were noted.

Item 14. Pubic Hair Sample - Robert Wade: Numerous hairs were noted.



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Item 15. Head Hair Combing - Robert Wade: Numerous hairs were noted.

Item 16. Head Hair Sample - Robert Wade: Numerous hairs were noted.

Item 17. Known Blood Sample - Robert Wade: This item has been processed by the Serology section of the laboratory.

Item 18. Known Saliva Sample - Robert Wade: This item was retained for further testing.

Item 19. Mattress Cuttings (2)/control cutting: The red-brown stains in cutting A measure approximately  $\frac{1}{2}$ " x  $\frac{1}{2}$ " and  $1\frac{1}{4}$ " x  $\frac{1}{8}$ ". The red-brown stain in cutting B measures approximately  $\frac{1}{4}$ " x  $\frac{1}{4}$ ". Testing for the presence of human blood was positive on the red-brown stains recovered from the mattress.

## CONCLUSIONS

### Serological Examinations - Seminal Residue

Testing for the presence of seminal fluid residue and sperm cells was positive on the following items:

Item 1c. Vaginal Swabs (3)  
Item 2. Orange Pants (crotch cutting)  
Item 10. T-shirt (lower area)

### Serological Examinations - Human Blood

Testing for the presence of human blood was positive on the following items:

Item 2. Orange Pants (right leg)  
Item 3. White Bra (right cup and interior left side)  
Item 4. Orange Striped Shirt (left neck, interior left sleeve and front area)  
Item 5. T-shirt (mid-center and bottom interior edge)  
Item 6. Grey Sweater (mid-center interior)  
Item 10. T-shirt (left strap, interior side and chest)  
Item 8. Blue Pants (front fly area and left leg)  
Item 9. Yellow Sheet (5-cuttings)  
Item 11. Blue Tablecloth (3-cuttings)  
Item 12. Comforter (3-cuttings)  
Item 19. Mattress (2-cuttings)

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COMMENTS

Specimens from the following items have been retained should comparative analysis be requested:

Item 1c.	Vaginal Swabs (3)
Item 1d.	Oral Secretions
Item 2.	Orange Pants
Item 3.	White Bra
Item 4.	Orange Striped Shirt
Item 5.	T-shirt
Item 6.	Grey Sweater
Item 7.	Known Blood Sample - Johanna Francescon
Item 8.	Blue Pants
Item 9.	Yellow Sheet
Item 10.	T-shirt
Item 11.	Blue Tablecloth
Item 12.	Comforter
Item 17.	Known Blood Sample - Robert Wade
Item 18.	Known Blood Sample - Robert Wade
Item 19.	Mattress

Please note that comparative analysis necessitates the submission of the appropriate standards from both the victim and the suspect.

Further analysis upon request.



Debbie McKillop Shields  
Chemist II  
Crime Laboratory



DMS/dms

Report to: ADA Jean Holmes  
Plymouth D.A.'s Office

Tpr. Frank Hommel  
Plymouth CPAC

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## COMMONWEALTH OF MASSACHUSETTS

Middlesex, ss.

Debbie McKillop Shields, whom I know to be a Chemist of the Massachusetts Department of State Police Crime Laboratory appeared before me and affirmed the attached to be the results made on Lab.No.:C93-1187 Lakeville, a Reported Sexual Assault, Fatal Beating in Lakeville.

Sworn and subscribed to before me this 30<sup>th</sup> day of June 1997.

Ann Shirley Todd  
NOTARY PUBLIC

My commission expires:

March 22, 2002

C93-1187 Lakeville

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March 10, 1997

**EXAMINATION**

Grouping tests conducted on the aforementioned known samples revealed the following:

SEROLOGY RESULTS - KNOWN SAMPLES						
SAMPLE DESCRIPTION	ABO/SECRETOR STATUS	PGM	EsD	EAP	ADA	AK
Blood and Saliva - Francescon	(H/O) / secretor <i>2hr</i>	1- 1+	1	BA	1	1
Blood and Saliva - Wade	(H/O) / secretor	1+2+	1	A	1	1

**KEY**

ABO = Blood Group (antigens)

EAP = Erythrocyte Acid Phosphatase

PGM = Phosphoglucomutase Subtyping

ADA = Adenosine Deaminase

EsD = Esterase D

AK = Adenylate Kinase

Grouping tests conducted on the following seminal samples revealed the results below:

SEROLOGY RESULTS - QUESTIONED SAMPLES			
SAMPLE DESCRIPTION	BODY FLUID(S) IDENTIFIED	ABO(H)	PGMsub
<i>7m</i> <i>who</i> <i>resid</i> Item 1c. Vaginal Swab	seminal residue	H/O	1-1+2+
Item 2. Orange Pants (crotch - #1)	seminal residue and amylase	H/O	---
Item 2. Orange Pants (crotch - #2)	seminal residue and amylase	A.H/O	---
Item 2. Orange Pants (crotch - #3)	seminal residue and amylase	H/O	---
Item 10. T-shirt, lower area (stain #1)	seminal residue and amylase	H/O	---
Item 10. T-shirt, lower area (stain #2)	seminal residue and amylase	H/O	---

**KEY**

ABO(H) = Blood Group Substances

--- = inconclusive

PGMsub = Phosphoglucomutase Subtyping

Amylase, a constituent of saliva was detected.

All positive results are set forth above. For clarity, the control specimens were omitted from the above table.

*enzyme which  
helps change starch  
into sugar*

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what tests did you perform and what were the results?

On the standards, we were looking for, one would be the blood type of the individuals involved. That test was conducted, along with what's called a secretor status. That is conducted on the saliva specimen from the standards. In addition, there are five enzyme systems which are used to enable, to build a profile, you might say, of the different components in the samples that were obtained.

Q And did you do that with the blood sample from Mrs. Francescon?

A Yes.

Q And could you tell the jurors what your result was?

A She's consistent with having type O blood and she's called a secretor, meaning that she will secrete her blood group substances in other body fluids besides her blood. This means that I'm able to look at her saliva, a saliva sample does not have blood in it, but by doing a test, I can find blood group substances within the saliva that will indicate her blood type. About eighty percent of the population are considered



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saliva - Francescon", of an H and a slash and an O. What does the H stand for?

A The H is the identifying factor that we look for. It would be the H antigen, and that indicates a type O person.

Q Now, did you do similar tests on the blood and saliva samples of the Defendant, Robert Wade?

A Yes, the same tests were conducted on his blood and saliva.

Q And can you tell the jurors what the results were in regards to Mr. Wade?

A Yes, he also has type O blood, he is also a secretor. He has a PGM type of one plus, two plus, and his ESD type is one, his EAP type is A, his ADA type is one, and his AK type is also one.

Q Now, in regards to the blood type, the O, is it fair to say that people have different, different people have different blood types?

A Yes.

Q And in regards to the subgroupings that you've just talked about in regards to your testing of the blood, the PGM, ESD, EAP, ADA and the AK, again, are those tests used in order to identify different qualities that might exist in different individuals in their blood?

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1 A Yes.

2 Q And what results did you get?

3 A On cutting number one, I found H blood group  
4 substances consistent with someone who has type O  
5 blood and is a secretor. The same was found on  
6 cutting three. I found H blood group substances  
7 consistent with an individual who has type O blood  
8 and is a secretor. On the cutting number two, I  
9 found, again, H blood group substances, again  
10 consistent with someone that is an O secretor. In  
11 addition, I found an A blood group substance which  
12 would originate from an A secretor.

13 Q When you say would have originated from an A  
14 secretor, what type of fluid or how would, what  
15 type of fluid would leave an A secretor marking on  
16 an item such as this at the level of tests that  
17 you were doing?

18 A At this level, any potential body fluid can leave  
19 that. It can be seminal fluid, it can be saliva,  
20 it can be perspiration. It can be any form of  
21 body fluid that would be secreted from an  
22 individual who is considered a secretor.

23 Q And how would it be transferred or can it be  
24 transferred, rather, simply by touching the item?

25 A Yes, a secretor can handle an item, for instance,

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and in that fashion, the potential of transferring their perspiration from their hands, yes, can be transferred to an item and then be detected in the test that I did. That is a possibility.

Q And in this particular case, would it be fair to say to a reasonable degree of medical certainty that that A in that particular location would be consistent with an individual being an A secretor having handled that item at some point in time?

MR. SHINE: Objection.

THE COURT: Overruled.

Q Can you say whether or not that would be --

A (Interrupting) I can say that the presence of the A would be consistent from someone who is an A secretor. In what mechanism the sample or the body fluid got onto that sample, I could not say.

Q But, it comes from touching.

MR. SHINE: Objection.

THE COURT: Overruled.

THE WITNESS: That would be a possibility, yes.

Q Did you also conduct testing in regards to the third sample that you took in this large area in the crotch of the pants?

A Yes.

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1 certainty?

2 MS. HOLMES: I'm sorry, a reasonable  
3 degree of scientific certainty.

4 THE COURT: Then you may have it.

5 MS. HOLMES: Thank you.

6 THE COURT: Over your objection.

7 Q With a scientific certainty in mind, were you able  
8 to come to a conclusion?

9 A Yes.

10 Q And can you tell the jurors what that is?

11 A In reference to the vaginal swab, at this level of  
12 analysis, the suspect cannot be excluded as a  
13 contributor into that sample.

14 Q And why is that? Can you explain to the jurors  
15 how you come to that conclusion?

16 A Yes. In comparing the results obtained with the  
17 standard from the suspect, Mr. Wade, he is both an  
18 O secretor, meaning he has blood type O, and he's  
19 a secretor. On that particular sample, we do find  
20 the evidence reflects O blood, excuse me,  
21 individual of type O, is also a secretor, and the  
22 fact that his PGM markers are present in that  
23 sample. The Defendant is a one plus, two plus,  
24 and a one plus, two plus is identified in the  
25 specimen. The specimen is the seminal residue

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1 that was tested.

2 Q And there's three numbers there. Can you explain  
3 to the jurors the three numbers that you have on  
4 the PGM, what that means, the significance of the  
5 one minus, one plus, two plus?

6 A The presence of three bands, and when I say bands,  
7 I mean the fact that these are identified as bands  
8 on a gel, three bands indicate the presence of  
9 more than one contributor. When someone is born,  
10 they can only have two bands, or perhaps one band  
11 if the bands are identical, they would reflect a  
12 single band. The presence of three bands then  
13 indicates that the contributor of that specimen,  
14 there is more than one person. This sample being  
15 a vaginal swab collected from the interior of the  
16 vaginal cavity of the victim, it is consistent to  
17 have any of her contributing factors present  
18 there.

19 Q And why is that?

20 A The specimen would be collected from her vaginal  
21 cavity.

22 Q Is there a bodily fluid that would then contribute  
23 to that particular item?

24 A Yes, the vaginal secretions could give you a  
25 result, would give you a result that would reflect



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1 the person whose sample was collected. In this  
2 particular case, we have a combination of factors,  
3 and the victim cannot, the victim cannot be  
4 excluded as a contributor of that sample.  
5 However, she cannot be a contributor of the  
6 seminal fluid. She's not capable of producing  
7 seminal fluid. So, she cannot be a contributor of  
8 the seminal fluid portion.

9 Q Ms. McKillop-Shields, can you or were you able to  
10 or can you give us an opinion to a reasonable  
11 degree of scientific certainty as to whether or  
12 not the results that you got on the vaginal swab  
13 would be consistent with bodily fluids combined  
14 from the victim in this case and the Defendant in  
15 this case?

16 A Yes, it would be consistent with that.

17 Q Were you able to make any further comparisons in  
18 regards to the orange pants?

19 A In regards to the orange pants, in all three  
20 specimens, the suspect cannot be excluded as a  
21 contributor or a source of the seminal residue and  
22 amylase identified on those items. However, on  
23 item specimen two which is cutting number two, he  
24 cannot be the single source.

25 Q In regards to those, the orange pants, does the

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1 same principle apply that you just told us about  
2 in regards to the victim's vaginal secretions  
3 being also represented in those samples, possibly?

4 A Right, the fact that she is a secretor, then her  
5 blood group substances would be in her vaginal  
6 secretions, and it could also be in the amylase  
7 which is the saliva. I'm unable to tell you from  
8 which individual the saliva came from, but, in  
9 fact, that the presence of saliva is there, and it  
10 could be that saliva can also contribute to these  
11 blood group substances.

12 Q And would the seminal fluid be consistent with  
13 having come from the Defendant in this case?

14 A Yes, at this level of analysis, he cannot be  
15 excluded as a contributor into the stain, yes,  
16 into the seminal residue amylase stain.

17 MS. HOLMES: Thank you, I have no  
18 further questions.

19 CROSS EXAMINATION BY MR. SHINE

20 Q Good afternoon.

21 A Good afternoon.

22 Q I'm going to ask you, I'm going to cut to the  
23 chase here. There were three samples taken off  
24 the orange pants and all three tested positive for  
25 the presence of seminal residue and amylase.